

# MID-ATLANTIC HYDRIC SOILS GLOSSARY

(represents a modified version of the glossary found in the Field Indicators of Hydric Soils in the United States)

**A Horizon** - Mineral horizon that formed at the surface or below an O horizon where organic material is accumulating. See Keys to Soil Taxonomy (1999) for complete definition.

**\*Abrupt Boundary** - Used to describe redoximorphic features that grade sharply from one color to another. The color grade is commonly less than 0.5 mm wide. Clear and gradual are used to describe boundary color gradations intermediate between abrupt and diffuse.

**Accreting Areas** - Landscape position where soil material accumulates through deposition from higher elevations or upstream positions more rapidly than is being lost through erosion.

**Anaerobic** - A condition in which molecular oxygen is virtually absent from the soil.

**Anaerobiosis** - Microbiological activity under anaerobic conditions.

**Aquic Conditions** - Conditions in the soil represented by: depth of saturation, occurrence of reduction, and redoximorphic features. See Keys to Soil Taxonomy (1999) for complete definition.

**Artificial Drainage** - Refers to removing surface water or lowering the water table in wet soils by such methods as ditching or installation of tile.

**Atypical Situation** - As used herein, this term refers to areas in which one or more parameters (vegetation, soil, and/or hydrology) have been sufficiently altered by recent human activities or natural events to preclude the presence of wetland indicators of the parameter.

**Calcic Horizon** - An illuvial horizon in which carbonates have accumulated to a significant extent. See Keys to Soil Taxonomy (1999) for complete definition.

**Calcium Carbonate** - Chemical formula is  $\text{CaCO}_3$ . Calcium carbonate effervesces when treated with cold hydrochloric acid.

**Capillary Fringe** - A zone of saturated or near saturated soil just above the water table, caused by capillary action.

**Chroma** - See **Munsell Color Notation**.

**Closed depression** - Any sunken or lower-lying area (excluding tree-tip pits) that has no surface drainage outlet and from which water escapes only by evapotranspiration loss or subsurface drainage (e.g. sinkhole). Some areas are large enough to be indicated on a topographic map by a hatched contour line forming a closed loop.

**COE** - US Army Corps of Engineers.

**Common** - When referring to redox concentrations and/or depletions, common represents 2 to 20 percent of the observed surface.

**Concave Landscapes** - A landscape whose surface curves downward like the inner surface of a sphere. In comparison, a convex landscape has a surface curving or bulging outward like the exterior surface of a sphere.

**Concretions** - See **Fe/Mn Concretions**.

**\*Covered, Coated, Masked** - These are terms to describe all of the redoximorphic processes by which the color of soil particles are hidden by organic material, silicate clay, iron, aluminum, or some combination of these.

**\*Depleted Matrix** - A depleted matrix refers to the volume of a soil horizon or subhorizon from which iron has been removed or transformed by processes of reduction and translocation to create colors of low chroma and high value. A, E, and calcic horizons may have low chromas and high values and may, therefore, be mistaken for a depleted matrix; however, they are excluded from the concept of depleted matrix unless common or many, distinct or prominent redox concentrations as soft masses or pore linings are present. In some places the depleted matrix may change color upon exposure to air (reduced Matrix). This phenomenon is included in the concept of depleted matrix. The following combinations of value and chroma identify a depleted matrix:

1. Matrix value 5 or more and chroma 1 or less with or without redox concentrations as soft masses and/or pore linings; or
2. Matrix value 6 or more and chroma 2 or less with or without redox concentrations as soft masses and/or pore linings; or
3. Matrix value 4 or 5 and chroma 2 and has 2 percent or more distinct or prominent redox concentrations as soft masses and/or pore linings; or
4. Matrix value 4 and chroma 1 and has 2 percent or more distinct or prominent redox concentrations as soft masses and/or pore linings.

**Depressional landform** - Types of closed depressions that may be found in the Mid-Atlantic include: glacial potholes; Carolina Bay or Delmarva Bay – shallow and generally marshy closed depressions in the Atlantic coastal plain; Grady ponds; some pocosins - a "swamp on a hill;" vernal pools - seasonal ponds which supports a semi-aquatic or aquatic ecosystem adapted to annual cycles of standing water in the springtime followed by drying in the summer / autumn; and abandoned oxbows or meanders - abandoned stream channel that may fill after rainfall or during flooding and supports an ephemeral body of standing water.

**Diffuse Boundary** - Used to describe redoximorphic features that grade gradually from one color to another. The color grade is commonly more than 2 mm wide. Clear and gradual are used to describe boundary color gradations intermediate between abrupt and diffuse.

**\*Distinct**<sup>1</sup>- Readily seen, but contrasts only moderately with the color to which compared. The contrast is distinct if the:

1. delta hue = 0, and
  - a. delta value  $\leq 2$  and a delta chroma  $> 1$  to  $< 4$ , or
  - b. delta value  $> 2$  to  $< 4$  and delta chroma  $< 4$ ;
2. delta hue = 1, and
  - a. delta value  $\leq 1$  and delta chroma  $> 1$  to  $< 3$ , or
  - b. delta value  $> 1$  to  $< 3$ , delta chroma  $< 3$ ; or
3. delta hue = 2, and
  - a. delta value = 0 and delta chroma  $> 0$  to  $< 2$ , or
  - b. delta value  $> 0$  to  $< 2$  and delta chroma  $< 2$ .

<sup>1</sup>If the mottle and matrix both have values of  $\leq 3$  and chromas of  $\leq 2$ , the color contrast is Faint, regardless of the difference in hue.

**E Horizon** - A mineral horizon in which the dominant process is loss of silicate clay, iron, and/or aluminum, leaving a concentration of sand and silt particles. See Soil Taxonomy (1999) for complete definition.

**Eh Value** - A measure of redox potential.

**EPA** - US Environmental Protection Agency.

**Epipedon** - Horizon that has developed at the soil surface, including anthropic, histic, melanic, mollic, ochric, plaggen, or umbric epipedon (Gr. **epi**=upon, **pedon**= soil). Epipedon is not synonymous with the A horizon, but would typically include the A horizons that have been in place long enough for diagnostic properties to develop and could extend downward into or through subsurface B horizons. See Keys to Soil Taxonomy (1994) for complete definitions.

**Faint color contrast between redoximorphic features and the Matrix** – The contrast is faint if the:

1. delta hue = 0 and delta value  $\leq 2$  and a delta chroma  $\leq 1$
2. delta hue = 1 and delta value  $\leq 1$  and delta chroma  $\leq 1$
3. delta hue = 2 and delta value = 0 and delta chroma = 0
4. delta hue  $\geq 3$  and delta value and delta chroma are non-applicable.

All other redox features have either distinct or prominent contrast with the soil matrix.

Each delta hue is considered to be “1 hue apart” from adjacent hues on this list:

10R, 2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, 5Y, 10Y, 5GY, 10GY, 5G, 10G, 5BG, 10BG, 5B, 10B, 5PB. The Hue of N (Neutral) should be considered “1 hue apart” from Hue 10B and 5PB and “2 hues apart” from all other Hues. In newer (blue cover) Munsell™ books, each page has only one Hue, except the Gley Pages. Some older (brown cover) Munsell™ books had more than one Hue on the same page.

Both Matrix and Mottle colors must have value  $\leq 3$  and chroma  $\leq 2$ .

**Fe/Mn Concretions** - Firm to extremely firm irregularly shaped bodies with sharp to diffuse boundaries. When broken in half, concretions have concentric layers. See Vepraskas (1994) for complete discussion.

**Fe/Mn Nodules** - Firm to extremely firm irregularly shaped bodies with sharp to diffuse boundaries. When broken in half, nodules do not have visibly organized internal structure. See Vepraskas (1994) for complete discussion.

**Few** - When referring to redox concentrations and/or depletions, few represents less than 2 percent of the observed surface.

**Fibric** - See **Peat**.

**Fine-earth Fraction** - Refers to the sand, silt, and clay components of soil, which are less than 2mm in diameter.

**Folists** - Histosols that are not saturated with water for more than a few days following heavy rains. See Keys to Soil Taxonomy (1994) for complete definition.

**Fragmented Soil Material** - Soil material that consists of 90% or more rock fragments. Less than 10% of the soil consists of particles 2 mm or smaller.

**Frequently Flooded or Ponded** - A frequency class in which flooding or ponding is likely to occur often under usual weather conditions (more than 50 percent chance in any year, or more than 50 times in 100 years).

**FWS** - US Department of Interior, Fish and Wildlife Service.

**g** - A horizon suffix indicating the horizon is grey due to wetness but not necessarily gleyed. All gleyed matrices (see definition below) should have the suffix “g,” however, all horizons with the “g” suffix are not gleyed. For example, a horizon with the color 10YR 6/2 that is at least seasonally wet, with or without other redoximorphic features, should have the “g” suffix.

**Glaucinitic** - A mineral aggregate that contains micaceous mineral resulting in a characteristic green color, e.g. glauconitic shale or clay.

**Glaucinite** - A hydrous silicate of potassium, iron, aluminum, or magnesium, occurring in greensand.

**\*Gleyed Matrix** - Soils with a gleyed matrix have the following combinations of hue, value, and chroma and the soils are not glauconitic:

1. 10Y, 5GY, 10GY, 10G, 5BG, 10BG, 5B, 10B, or 5PB with value 4 or more and chroma is

- 1; or
2. 5G with value 4 or more and chroma is 1 or 2; or
3. N with value 4 or more; or
4. (for testing only) 5Y, value 4, and chroma 1.

In some places the gleyed matrix may change color upon exposure to air (reduced Matrix). This phenomenon is included in the concept of gleyed matrix.

**\*Hemic - See Mucky Peat.**

**Histic Epipedon** - A thick (20-60 cm {8-24 in.}) organic soil horizon that is saturated with water at some period of the year unless artificially drained and that is at or near the surface of a mineral soil. See Soil Taxonomy (1999) for complete definition.

**Histels** - Organic soils that overly permafrost and show evidence of cryoturbation. See Soil Taxonomy (1999) for complete definition.

**Histosols** - Organic soils that have organic soil materials in more than half of the upper 80 cm. (32 in.), or that are of any thickness if they overly rock or fragmental materials that have interstices filled with organic soil materials. See Soil Taxonomy (1999) for complete definition.

**Horizon** - A layer, approximately parallel to the surface of the soil, distinguishable from adjacent layers by a distinctive set of properties produced by soil-forming processes. See Soil Taxonomy (1999) for complete definition.

**Hue** - See **Munsell Color Notation**.

**Hydric Soil Criteria (1995)** - Criteria used to generate a list of hydric soils from the national database of Soil Interpretation Records maintained by NRCS, namely:

1. All Histels except Folistels and all Histosols except Folists, or
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Aquisalids, Historthels, and Histoturbels great groups, and Cumulic or Pachic subgroups that are:
  - a. somewhat poorly drained with a water table equal to 0.0 foot (ft.) from the surface during the growing season, or
  - b. poorly drained or very poorly drained and have either:
    - (1) water table equal to 0.0 ft. during the growing season if textures are coarse sand, sand, or fine sand in all layers within 20 inches (in.), or for other soils
    - (2) water table at less than or equal to 0.5 ft. from the surface during the growing season if permeability is equal to or greater than 6.0 in./hour (h.) in all layers within 20 in., or
    - (3) water table at less than or equal to 1.0 ft. from the surface during the growing season, if permeability is less than 6.0 in./h. in any layer within 20 in., or
3. Soils that are frequently ponded for long or very long duration during the growing season, or
4. Soils that are frequently flooded for long or very long duration during the growing season.

**Hydric Soil Definition (1994)** - A soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

**Hydrogen Sulfide Odor**- A gas ( $H_2S$ ) produced as compounds of sulfur undergo reduction. It produces a smell similar to rotten eggs.

**Hydromorphic** - Features in the soil caused or formed by water.

**Layer(s)** - A horizon, subhorizon, or combination of contiguous horizons or subhorizons that share a property(s) referred to in the Indicators.

**Limnic** - Organic and inorganic materials that were either (1) deposited in water by precipitation or through action of aquatic organisms such as algae or diatoms, or (2) derived from aquatic plants and subsequently modified by aquatic animals. Limnic materials include sedimentary peat, diatomaceous earth, and marl.

**Lithologic Discontinuity** - Occurs in a soil that has developed in more than one type of parent material. Commonly determined by a significant change in particle-size distribution, mineralogy, etc., that indicates a difference in material from which the horizons formed.

**Long Duration (flooding or ponding)** - A duration class in which inundation for a single event ranges from 7 days to 1 month.

**LRR** - Land Resource Region. LRRs are geographic areas characterized by a particular pattern of soils, climates, water resources, and land use. Each LRR is represented by a different letter of the alphabet (A-Z). LRR's are defined in USDA Ag. Handbook 296.

**Macropores** - Large pores in the soil. The five size classes of pores are defined as very fine, less than 0.5mm; fine, 0.5-2mm; medium, 2-5mm; coarse, 5-10mm; and very coarse, equal to or greater than 10mm. Macropores include those larger than 1mm.

**Many** - When referring to redox concentrations and/or depletions, many represents more than 20 percent of the observed surface.

**Marl** - An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal proportions; formed primarily under fresh water lacustrine conditions. See Soil Taxonomy (1999) for complete definition.

**Matrix** - The dominant soil volume which is continuous in appearance and envelops microsites. When three colors exist, such as when a matrix, depletions, and concentrations are present, the matrix may represent less than 50 percent of the total soil volume.

**Mineral Layers** - Soil horizons that are mainly mineral material and relatively low in organic

material. The bulk density of mineral layers is greater than that of organic layers.

**MLRA** - Major Land Resource Areas. MLRAs are geographically associated divisions of Land Resource Regions. MLRA's are defined in USDA Ag. Handbook 296.

**Mollic Epipedon** - A mineral surface horizon that is relatively thick, dark colored, humus rich, and has high base saturation. See Soil Taxonomy (1999) for complete definition.

**Mollisols** - Mineral soils that have a mollic epipedon. See Soil Taxonomy (1999) for complete definition.

\***Muck** - A sapric organic soil material in which virtually all of the organic material is decomposed, not allowing for identification of plant forms. Bulk density is normally 0.2 g/cc or more. Muck has < 1/6 fibers after rubbing and sodium pyrophosphate solution extract color has lower value and chroma than 5/1, 6/2, and 7/3. See **Organic Soil Material** also.

\***Mucky Modified Texture** - A USDA soil texture modifier, e.g. mucky sand. Mucky modified mineral soil with 0 percent clay has between 5 and 12 percent organic carbon. Mucky modified mineral soil with 60 percent clay has between 12 and 18 percent organic carbon. Soils with an intermediate amount of clay have an intermediate amount of organic carbon.

\***Mucky Peat** - A hemic organic material with decomposition intermediate between that of fibric and sapric organic material. Bulk density is normally between 0.1 and 0.2 g/cc. Mucky peat does not meet fiber content (after rubbing) or sodium pyrophosphate solution extract color requirements for either fibric or sapric soil material. See **Organic Soil Material** also.

**Munsell Color Notation** - A color designation system that specifies the relative degree of the three simple variables of color: hue, value, and chroma. For example, 10YR 6/4 is a color (of soil) with hue = 10YR, value = 6, and chroma = 4. Hue is a measure of the wavelength of light. Value is a measure of the relative lightness or intensity of color. Chroma is a measure of the relative purity, strength, or saturation of a color; directly related to the dominance of the determining wavelength of the light.

**Neutral Hue** - Indicating absolute achromatic color (pure grays, black, or white) that has 0 chroma and no hue.

**Nodules** - See **Fe/Mn Nodules**.

**NRCS** - USDA Natural Resources Conservation Service (formerly Soil Conservation Service).

**NTCHS** - National Technical Committee for Hydric Soils.

**Organic Matter** - Plant and animal residue in the soil in various stages of decomposition.

**Organic Soil Material** - Soil material that is saturated with water for long periods or artificially

drained and, excluding live roots, has an organic carbon content of: 18 percent or more with 60 percent or more clay, or 12 percent or more organic carbon with 0 percent clay. Soils with an intermediate amount of clay have an intermediate amount of organic carbon. If the soil is never saturated for more than a few days, it contains 20 percent or more organic carbon. Organic soil material includes \*Muck, \*Mucky Peat, and \*Peat.

**Oxidation** - Process by which a molecule gains atoms of oxygen or loses electrons; e.g.  $\text{Fe}^{2+}$  oxidized to  $\text{Fe}^{3+}$  or  $\text{Fe}_2\text{O}_2$  is oxidized to  $\text{Fe}_2\text{O}_3$  when oxygen is present in the soil.

**\*Peat** - A fibric organic soil material with virtually all of the organic material allowing for identification of plant forms. Bulk density is normally  $<0.1$  g/cc. Peat has 3/4 or more fibers after rubbing, or 2/5 or more fibers after rubbing and sodium pyrophosphate solution extract color of 7/1, 7/2, 8/2, or 8/3. See **Organic Soil Material** also.

**Ped** - A unit of soil structure such as an aggregate, prism, block, or granule, formed by natural processes (in contrast with a clod, which is formed artificially).

**Pedon** - A three-dimensional body of soil with lateral dimensions large enough to permit the study of horizon shapes and relations. It is regarded as the smallest body of one kind of soil large enough to represent the nature and arrangement of horizons and variability of properties. If horizons are continuous and of uniform thickness, the pedon occupies a surface area of approximately 1 square meter and extends down to the lower limit of a soil.

**Piezometer** - An instrument for measuring hydrostatic pressure. In pedology, it is a tube used for insertion in bore holes to determine the depth to the water-saturated zone upon equilibrium or to determine permeability by timing water movement through the soil and into the tube.

**Plinthite** - The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. See Soil Taxonomy (1999) for a complete discussion of plinthite.

**Ponded/Ponding** - Standing water in a closed depression that is removed only by percolation, evaporation, and/or transpiration. Duration is greater than seven days.

**Pore Linings** - Zones of accumulation that may be either coatings on a pore surface or impregnations of the matrix adjacent to the pore. See Vepraskas (1994) for complete discussion.

**Problem Areas** - Potential wetland areas that are inherently difficult to identify because field indicators of one or more wetland parameters may be absent or misleading, at least at certain times of the year. Examples include vernal pools, prairie potholes, and vegetated flats. Problem soil areas include man-induced wetlands, wet entisols, soils from red or low-chroma parent material, wet spodosols, and wet mollisols.

**\*Prominent** - Contrasts strongly with the color to which they are compared. Color contrasts more contrasting than distinct are prominent.



**\*Red Parent Material** - Those parent materials with a natural inherent reddish color attributable to the presence of highly oxidized forms of iron (hematite) as coatings on and occluded within mineral grains. Soils derived from "red parent materials" inherit these colors, which greatly retard the development and extent of redoximorphic depletions that normally occur under prolonged aquic conditions. Red parent materials are associated with Triassic/Jurassic sediments, other local geologic formations containing red shale, red mudstone, or red sandstone as occur in the Hampshire and Mauch Chunk formations in Maryland, West Virginia, and Pennsylvania, and in colluvial or alluvial sediments from these areas.

**Redox Concentrations** - Bodies of apparent accumulation of Fe/Mn oxides. Redox concentrations include soft masses, pore linings, nodules, and concretions. For the purposes of the Indicators, nodules and concretions are excluded from the concept of redox concentrations unless otherwise specified by specific indicators. See Vepraskas (1994) for complete discussion.

**Redox Depletions** - Bodies of low chroma (2 or less) having values of 4 or more where Fe/Mn oxides have been stripped or where both Fe/Mn oxides and clay have been stripped. Redox depletions contrast distinctly or prominently with the matrix. See Vepraskas (1994) for complete discussion.

**Redox Potential** (Eh value) - The relative tendency of a chemical substance, measured in volts, to act as a reducing or oxidizing agent. In a soil solution containing the following elements, oxygen is most easily reduced, followed in order by oxides of N, Mn, Fe, S, and then C. Soils are believed to become hydric in this reduction sequence at the point when ferric Fe is being reduced by microbial activity to ferrous Fe.

**Redoximorphic Features** - Features formed by the processes of reduction, translocation, and/or oxidation of Fe and Mn oxides. Formerly called mottles and low chroma colors. See Vepraskas (1994) for complete discussion.

**Reduced Matrix** - Soil matrices that have low chroma and high value in situ, but whose color changes in hue or chroma when exposed to air. See Vepraskas (1994) for complete discussion.

**\*Reduction** - For the purpose of the Indicators, when the redox potential (Eh) is below the ferric/ferrous iron threshold as adjusted for pH. In hydric soils, this is the point when the transformation of ferric iron ( $\text{Fe}^{3+}$ ) to ferrous iron ( $\text{Fe}^{2+}$ ) occurs.

**Relict Features** - Soil morphological features that do not reflect recent hydrologic conditions of saturation and anaerobiosis, but reflect features that remain after one or more factors of soil formation have changed. For example, relict redoximorphic features could remain long after natural topographic changes or climatic changes have removed the saturation that caused the features. Soil features that remain after transient changes to the landscape, such as excavation of a drainage ditch, are not considered relict.

**\*Sapric** - See **Muck**.

**Saturation** - When the soil water pressure is zero or positive, most all the soil pores are filled with water.

**SCS** - USDA Soil Conservation Service (now Natural Resources Conservation Service).

**Sharp Boundary** - Used to describe redoximorphic features that grade sharply from one color to another. The color grade is commonly less than 0.1 millimeter wide.

**Soft Masses** - Redox concentrations that are not hard, frequently within the matrix, and whose shape is variable. See Vepraskas (1994) for complete discussion.

**Soil Texture** - The weight proportion of the soil separates for particles less than 2 mm.

**Spodic Horizon** - A mineral soil horizon that is characterized by the illuvial accumulation of amorphous materials composed of aluminum and organic carbon with or without iron. The spodic horizon has a certain minimum thickness and a minimum quantity of oxalate extractable carbon plus aluminum or specific color requirements, or both.

**Stratified** - Arranged in or composed of strata or layers. Normally reflects layers of sediments which formed by periodic deposition by flood waters.

**Stripped** - Refers to removal of organic matter coatings and/or oxides of iron and manganese to expose the color of uncoated soil particles.

**Tensiometer** - A device for measuring the tension with which water is held to soil in situ; a porous, permeable ceramic cup connected through a water-filled tube to a pressure measuring device; used to measure how tightly or freely water is held to the soil, and, thus, a measure of water availability to plants and of saturation.

**Texture** - See **Soil Texture**.

**\*Tree-tip pit**. The small pit or depression resulting from an area vacated by the root ball resulting from tree-tip ("tree-throw" or "blowdown"). Such pits are commonly adjacent to small mounds composed of the displaced material. These are not to be considered depressions as described in any of the Field Indicators such as F8.

**Umbric Epipedon** - A thick, dark mineral surface horizon that has base saturation of less than 50 percent. See USDA, NRCS, Soil Taxonomy (1999) for complete definition.

**Value** - See **Munsell Color Notation**.

**Vertisols** - A mineral soil with 30 percent or more clay in all layers. This soil expands and shrinks depending on moisture content and contains slickensides or wedge-shaped peds. See

USDA, NRCS, Soil Taxonomy (1999) for complete definition.

**\*Very Long Duration (flooding or ponding)** - A duration class in which inundation for a single event is greater than 1 month.

**Wetlands** - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

**Within** - When referring to specific indicator depth requirements, within means not beyond in depth, for example less than or equal to 15 cm (6 in.).

\* These terms, as defined in this glossary, are either defined for the first time or they have definitions that are slightly different from the definitions in the reference materials. These definitions are to assist users of this document and are not intended to add or to replace definitions in the referenced materials.

## **Graphical Representation of Indicators**

**For all Indicators:** The soil layer above the layer in which an Indicator applies must have a chroma of 2 or less, or be less than 10 cm. (4 in.) thick.

